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The History

and Circumstances of a

Peculiar Outbreak of Febrile Disease

in St. Mary's Roman Catholic Industrial
School for Boys, Glasgow, March, 1888.

By

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With Note on the Clinical Aspect of the Disease by

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THE HISTORY AND CIRCUMSTANCES OF A
PECULIAR OUTBREAK OF FEBRILE DISEASE
IN ST. MARY'S ROMAN CATHOLIC INDUSTRIAL
SCHOOL FOR BOYS, GLASGOW, MARCH, 1888.

ON the evening of Friday, 2nd March, a boy, aged 15, an inmate of St. Mary's Roman Catholic Industrial School for Boys, Abercromby Street, Glasgow, complained of headache, and was sent to bed in his dormitory. Next morning he rose with the other boys and made his bed, but being observed to be very unsteady on his legs was sent to the sick-room, where he died at 8 a.m. On 3rd March another boy, aged 14, complained of headache, and was sent to the sick-room and put under treatment. On the 5th, at 1 a.m., he became very delirious, and had to be held down in his bed. He was chloroformed and an enema of 20 grains of bromide of potassium administered. At 3 a.m. the convulsive movements ceased, and he seemed to fall into a natural sleep, but sunk and died at 4 a.m. At 5 p.m. on the 7th another boy, aged 11, reported himself ill, having vomited shortly before, and was sent to bed in his dormitory. The Superintendent's wife found him asleep about 6 p.m. A boy sent with tea could not rouse him, and he died comatose at 8 p.m. On the morning of the 8th, when the occupants of the middle dormitory were being wakened, a fourth boy, aged 14, was found to be unconscious, and by a quarter-past 6 he was dead. Only the second of these four boys had been seen by the Medical Officer of the Institution. These mysterious events, and the fact that 19 other inmates were more or less ill, led him to report the outbreak at the Sanitary Office on the morning of the 8th March; and 12 of the more serious cases were in the afternoon transferred to a separate ward in the Fever Hospital, Belvidere. On the 9th, 14 new cases occurred; on the 10th, 5; 11th, 8; 13th, 2 boys and 2 girls. These were the only inmates of the Girls' Department who were seized. They were employed in the kitchen in which the food for both departments was prepared. Further reference will subsequently be made to their case in discussing the causation of the outbreak,

in which the immunity of the Female Institution is a cardinal point. After an interval of two days, 1 boy became ill on the 16th March; on the 17th, 2; 18th, 2; 19th, 1. There was then a clear interval of two days, followed on the 22nd, 23rd, 24th, and 25th by 1 case each day. On the 26th, 2 fell ill; on the 27th, 1; and on the 29th, 1. This makes a total of 66 boys and 2 girls, the number of inmates being 207 boys and 194 girls. Of these, 29 boys and 2 girls were removed to Belvidere, and 37 (including the 4 fatal cases) were allowed to remain in the Institution.

Before proceeding to give a short statement of the chief clinical and pathological features of this disease it is only right to remark that the difficulties in the way of obtaining the facts were great, and were but partially overcome. The arrangements for treating the sick are very defective. No records are kept of the history, symptoms, and treatment of patients. The meagre facts given as to the 4 cases of sudden death were got from casual observers, only in one case supplemented by medical observation. The children are very dull and stupid, and practically contributed nothing to the subjective information. On the afternoon of the 8th March two trained nurses were got from the Glasgow Sick Poor and Private Nursing Association, one or other of whom was always on duty and took temperatures and made short notes of symptoms. The 19 children who are said to have sickened on the 8th means more probably all who took ill along with the fatal cases, and were at that date found ill. The numbers given afterwards are however correctly assigned. The more severe cases, in which the temperature was above 100° at the onset, including 12 of those found ill when the outbreak was reported, were transferred to Belvidere, where careful notes were taken by Dr. W. W. Christie. As he intends to make these the subject of a paper, I shall only make such use of them as is necessary to present the main general diagnostic features. Of the mild cases retained at the Institution I have the nurses' notes, supplemented by my own observations, which more or less embraced all the cases. I shall therefore give separately a short account (1) of the post-mortem appearances in two of the fatal cases; (2) of the symptoms in the 31 severe cases treated at Belvidere; (3) of the symptoms in the 33 mild cases kept at the Institution.

1. *Post-Mortem Appearances*.—The bodies of the first two fatal cases were interred without examination. This is specially

to be regretted in the second case, in which the illness lasted two days, and there was therefore time for the development of more marked lesions. The examination of the other two bodies was made by Dr. Joseph Coats, Pathologist to the Western Infirmary, on 8th March. The following are his reports :—

“ Dennis M'Guire, aged 11 years; died 7th March, at 8 p.m., after 3 hours of acknowledged illness.

“ Rigor mortis well developed.

“ Arms, lateral aspects of chest and neck present a livid colour, very deep on left ear; very little lividity of lower limbs.

“ *Brain* shows a certain dryness of the surface, but there is no hyperæmia of membranes and no exudation. The ventricles are not distended and the brain substance is of normal consistence.

“ *Heart*. The blood in heart and body generally is perfectly fluid. The heart itself is normal.

“ *Right Lung* firmly adherent, and there are some old condensations at apex; at root of lung some enlarged and slightly caseous glands.

“ *Left Lung* non-adherent and otherwise normal. There is no condensation in either lung.

“ *Right Kidney* extremely hyperæmic.

“ *Left Kidney*, similar.

“ The *Bladder* is greatly distended with urine, fundus reaching above umbilicus.

“ The *Liver* presents nothing remarkable.

“ The *Spleen* is considerably enlarged and hyperæmic. The Malpighian bodies are remarkably prominent.

“ In the lower part of *small intestine* there is a distinct, but not very considerable enlargement of solitary follicles and Peyer's Patches. There is no special hyperæmia of them.

“ *Mesenteric glands* are distinctly enlarged and slightly red. No degeneration or sign of tubercular lesion.

“ Bernard M'Kenna, aged 14 years; died at 6.15 a.m. on the 8th, having gone to bed apparently well and been found dying when the boys were being awaked half-an-hour previously.

“ Rigor mortis well developed.

“ Bluish colour over entire posterior aspect of body and on right lateral aspect of trunk and lower limb. There is also a blue mottling over the lateral aspects of trunk and neck.

“ *Brain*. Membranes present a moderate degree of injection, but there is no exudation, and the brain in general is normal in appearance.

“ *Heart*. The blood in heart is partly coagulated; heart normal.

“ Both *Lungs* are somewhat adherent, but otherwise normal in appearance.

" *Spleen* is somewhat enlarged, but not markedly hyperæmic. The Malpighian bodies are unduly prominent, but not so markedly as in other case.

" The *Kidneys* are moderately hyperæmic, right more so than left, but neither so much as in other case.

" *Mesenteric glands* are much enlarged but not generally red. They present no degeneration or sign of tubercular lesion.

" In the *small intestine* there is a general enlargement of the solitary follicles and Peyer's Patches, but it is not so great as in the other case.

" *Microscopic Examination.*

" Portions of the spleen, mesenteric glands, intestine, and brain were removed from both cases and prepared for microscopic examination. Nothing special was revealed by this examination, and, in particular, no micro-organisms were discovered." *

2. *Symptoms, &c., in 31 cases treated at Belvidere.*—(1) Invasion sudden. Headache was invariable and in many violent, frequently with nausea or vomiting; in a few cases rigors; in 3 sore throat. Pain in one or both sides was general. Occasionally there was drowsiness approaching to stupor. There was delirium in 2 cases; the face was flushed and signs of vascular excitement more or less obvious. Temperature taken on first declaration of illness always increased, in many cases as high as 103°, 104°, or even 105°. In one case it rose from 102°·6 to 105°·8 in the first 2½ hours; in another from 101° to 105°·2 in 3 hours; in another from 102° to 104°·5 in 4 hours; in another from 102°·8 to 104°·2 in 1 hour. (2) There was more or less cough at some time during the course of the illness in all cases but 1, in which, although the temperature ran up to 104°, there were absolutely no chest symptoms. Pneumonia was distinct in 17 cases, in all but 1 unilateral; doubtful in 8 cases—always limited in area. There was distinct catarrh of the air passages in 4 cases. (3) Herpes was present in 13 cases, sometimes appearing at the very outset. (4) The spleen was enlarged in 5 cases. (5) Chlorides in urine were slightly diminished in 9 cases. (6) Eruptions on body. Urticaria in 1 case. "Dusky spots and mottling on thighs" in 1 case. "Eruption probably due to irritation of flannel" in 1 case. "Taches bleuâtres" in 1 case.

* Dr. Maylard made culture-experiments with the blood of seven of the Belvidere patients, but with negative results. Micrococci were found in four cases, but different in all and probably of external origin. In the remaining three cases nothing was found.

Purpuric spots on legs during convalescence in 2 cases. (7) All the cases recovered. There were no deaths, excepting the 4 in the Institution at the outset. The highest temperatures noted were 106° , $106^{\circ}\cdot 2$, and in 2 cases, $106^{\circ}\cdot 4$. In all, the temperature rose at one time or another above $100^{\circ}\cdot 6$; in the greater majority above 103° . Pain in the joints, in 1 case with effusion, occurred in convalescence, in 5 cases. Recovery always perfect, and, when there was no lesion of the lungs, rapid, in view of the high fever and prostration. The average duration of febrile temperatures was 7 days; the average residence in hospital of the 17 distinctly pneumonic cases was $35\frac{1}{2}$ days; of the 8 doubtfully pneumonic cases 34 days; and of the 6 uncomplicated cases 26 days.

3. *Symptoms, &c., in 33 cases retained at the Institution.*— Invasion sudden. Headache and sickness almost always the first cause of complaint, usually with more or less pain chiefly referred to right side. Distinct drowsiness in 8 cases. In 7 cases temperature slightly above 100° , in 1 as high as $104^{\circ}\cdot 8$ for a few hours; in remainder never above normal, or only some fractions of a degree between $98^{\circ}\cdot 4$ and 100° . In short periods, from a few hours to two or three days, health was perfectly restored, frequently after deep sleep and perspiration. In 1 case there was diarrhœa. In some cases, especially after the alarmingly sudden deaths, fear might account for the condition of the boys, but, as a rule, the general aspect of these mild cases suggested a striking family resemblance to the severe cases, and a common origin or affinity. To one accustomed to see the *whole area* of epidemic outbursts, those retained at home as well as those sent to hospital, those who did not think it necessary to have medical aid as well as those who did, the aspect of this outbreak was exactly the same. There was the black centre of fatality, shading off outwards through the severe cases into the mild cases, and ending in a region of slight deviation from health which, dissociated from the central events, would have been misnamed or have escaped notice. Nothing was more striking with regard to these mild cases than the suddenness with which the patient plunged from perfect health into the disease, and emerged with equal suddenness into health again. The uncomplicated cases in hospital presented the same characteristic. A boy would take a hearty meal; become sick within an hour thereafter; his temperature taken at once might be up to 103° , and his aspect one of utter prostration; within the next twenty-four hours it might reach 105° ;

within a few hours more return to normal; and forty-eight or sixty hours from seizure he might be at the dinner table again!

The key to the discovery of the cause or explanation of this outbreak of disease is the limitation of it to the inmates of one of two kindred Institutions occupying different and structurally separate buildings placed side by side, one a little north of the other, viz., the Boys' Industrial School. The disease began there on 2nd March, and had run two-thirds of its course there, when, on 13th March, two girls were seized, the first and only cases on the female side. The two Institutions are worked together like one family. All the washing is done by the girls in one washing-house—all the cooking in one kitchen. There is a common larder, a common dietary, and a common dining-hall, into which the boys are marched to eat the meals cooked and set out by the girls, who clear away the dishes and set the table again for themselves. In this way there is an amount of intercommunication, which in the case of an infectious disease, such as typhus, scarlet fever, or smallpox appearing in one Institution, soon gives practical demonstration of reality. In all my dealings with St. Mary's Industrial Schools this has been a source of anxiety, as it was on the present occasion. These two girls were both employed in the kitchen. One of them was a sister of one of the 19 boys found lying ill on 8th March. Their mother had visited her son in the boys' sick-room, and on two occasions was allowed to see her daughter immediately afterwards. As regards the other girl there was no element suggestive of infection, excepting employment in the kitchen. Both had pneumonia—the one unilateral, the other bilateral—and, in fact, but for association would have been regarded as cases of inflammation of the lungs, due to exposure to alternations of heat and cold incident to their employment, at a time when the wind was due E. and the mean daily temperature averaged $32^{\circ}\cdot5$. As already stated, no other cases of sickness appeared among the girls. These two cases therefore remain on record as cases of pneumonia, which may either be regarded as isolated in causation or associated by infection with the outbreak among the boys. In either case, what we have to endeavour to explain is an outbreak of disease confined to the boys.

The circumstances described as to the internal economy of these Institutions at once exclude anything connected with food from

the possible causes. In material, preparation, and distribution, everything was common to both. Nevertheless enquiry was made as to the source of the milk supply, especially as to pleuropneumonia among the dairy stock; but, both as to quality and possible contamination, the milk as well as all other articles of food supply were found to be unimpeachable. The food seemed to be well cooked and the dietary sufficient.

Was the disease confined to any section of the inmates of the Boys' Institution, as to age, employment, or dormitory? (1) *Age*.—The average age of the 33 boys who were retained in the Institution (excluding the fatal cases) was 12 years; of the 29 removed to Belvidere, 11·8 years; of the 4 fatal cases, 13·5 years; of the remaining 141 boys who were not affected, 12·4 years. Contrasting those who were attacked with those who were not attacked, the average age of the former was 12 years; of the latter 12·4 years. Classified as to gravity, the average age of the severe cases (*i.e.*, the 4 fatal cases and the 29 sent to Belvidere) was 12 years; of the mild cases, 12 years. The only indication given by these figures is that those who escaped were the oldest, but of those attacked the oldest died. (2) *Habits*.—The fact that the first and fatal cases were among the older boys (*viz.*, 15, 14, 14, 11) gave support and currency to the opinion entertained by all the officials of the Institution that tobacco-chewing was the cause of the whole affair. It is stated that these lads were all tobacco-chewers. The other fact, that those who escaped were older on the average than those who were seized, bears in the opposite direction; but the tobacco theory must be rejected for much stronger reasons. A narcotic could never give rise to a febrile disease. Even the officials could not assert that every boy attacked was a tobacco-chewer, and when put to the boys individually, some who admitted their personal failing supported others in their assertion that they did not chew. In any case this practice, which undoubtedly to some extent prevails among the boys, and is unknown among the girls, takes its place among other more important differences, tending to a lower standard of health among the boys, to which we shall afterwards allude. (3) *Employment in the Institution*.—Both Institutions are conducted on the half-time system, *i.e.*, the one half of the inmates is in school while the other is in the workshop, sewing-room, washing-house, &c., and the half in the school-room in the forenoon is in the workshop, &c., in the afternoon, and *vice versa*. The bearing of this method is that any insanitary

condition within the Institution affecting the school-room or playground is common to all inmates of each Institution apart, just as the dining-hall and food are common to all inmates of both Institutions together. (4) *Workshops, &c., and Dormitories.*—Here there is a rigid division, so that any insanitary condition in a workshop or dormitory might tell on one section of the boys. The following Table shows the distribution of the boys as to employment and dormitory:—

	TRADE.						DORMITORY.		
	Firewood.	Paperbag-making.	Tailor.	Shoe-making.	Nothing.	Miscells.	Top.	Middle.	Low.
Died,	1	—	—	2	1	—	1	1	2
Removed to Belvidere,	11	5	3	4	6	—	9	4	16
Treated at Institution,	9	5	6	1	11	1 ¹	12	13	8
Not attacked,	63	16	20	12	25	5 ²	47	51	43
Total,	84	26	29	19	43	6	69	69	69
Percentage attacked,	25	38	31	37	42	17	32	26	38

¹ Van-boy. ² 2 Door-keepers, 2 Engine-boys, 1 Infirmary Boy.

No set of boys was exempt; though all did not suffer in the same proportion. Those employed in the manufacture of fire-lighters were most exempt, but those who had no special employment suffered most. Those sleeping in the middle dormitory were most exempt. Still we may conclude that, whatever the noxious influence was, all in the Institution were exposed to it. There may have been some subordinate modifying circumstances connected with the conditions under consideration, but it is equally possible that the different results in those sections of the boys were accidental.

The site of these Institutions is one which is utterly unsuited for the residence and upbringing of children, especially children who have inherited impaired constitutions and are the waifs of a large city. It is in the centre of a populous working-class district—within a block, surrounded by four-storey tenements and work-

shops, in the midst of which is a graveyard, which was opened in 1839. Its extent is 5,333 square yards. In a printed Report on the Burial Grounds of Glasgow by the late Sanitary Inspector, dated 1875, he says:—"Notwithstanding its recent erection, this cemetery is greatly overcrowded with bodies, and kept in a state of rank disorder. Orders for 390 interments were granted during



A BOYS' SCHOOL.

B GIRLS' SCHOOL.

the past six years. The common ground, containing the remains of many who died of cholera [in 1848], has been covered with earth to a depth of six feet, for the purpose of forming accommodation for new interments, some of which had been made before the Sheriff's restriction." This refers to the fact that the graveyard

was closed by order of the Sheriff, at the instance of the Local Authority, along with other intramural burying-grounds, in 1870. Permission has, however, since been granted by the Local Authority to inter near relatives of lairholders in this as in the other cemeteries. Up to 1875, as stated above, the number of interments thus made amounted to 390, and since to the following number in each year, viz.:—1875, 39; 1876, 26; 1877, 19; 1878, 23; 1879, 17; 1880, 15; 1881, 7; 1882, 3; 1883, 9; 1884, 7; 1885, 5; 1886, 10; 1887, 4; up to date of outbreak, 3; a total of 187 bodies. On the western verge of this graveyard a Convent was erected, which was in 1862 transformed into an Industrial School. In 1868 a separate school for boys was built to the north. They are therefore shut up with this graveyard inside a barrier of dwelling-houses in flats, and public works, which extends continuously round the W., N., and E. sides, the south-side being partially closed in by a large Roman Catholic Chapel and Day Schools. The situation of these Institutions has been repeatedly condemned in official Reports by H.M. Inspector of Industrial Schools and Reformatories.

Such being the insanitary conditions which surround both Institutions alike, let us compare their internal arrangements, especially as to area and capacity. The number of inmates is of course a cardinal datum for comparison. The boys' division is licensed for 200; the girls' for 190,* but there were 207 boys and 194 girls at the time to which this enquiry refers. It is obvious that these numbers are frequently exceeded, especially on the boys' side. Thus, the Government Reports give the average number of inmates as in 1878, 247 boys and 204 girls; in 1879, 241 boys and 214 girls; in 1880, 246 boys and 212 girls; in 1881, 242 boys and 208 girls; in 1882, 240 boys and 202 girls; in 1883, 231 boys and 189 girls. I shall take the number of beds in the main dormitories of each at this time as a fair standard, viz., 210 for boys and 190 for girls, excluding the sick-room beds in each case.

Superficial area.—The Master of Works informs me that the entire area occupied by the Boys' Institution is 1,470 square yards; by the Girls', 1,960 square yards. This gives 7 square yards per head for the boys and 10·3 square yards for the girls. He also states that of this there is open space, available for play-ground, 600 square yards for the boys and 800 for the girls, or nearly 3

* Recently increased from 175 on the extraordinary plea that a play-shed had been provided!

square yards per boy and 4·2 square yards per girl. But while the boys have no covered play-space for wet weather, the girls have a cloister, which can be shut in entirely, with an area of 240 square yards. This raises the available play-space for the girls to nearly 5·5 square yards per head against 3 for the boys. In winter, in the evening, before going to bed, and on Sundays, in bad weather, all the boys are put into the school-room, where they have 108 cubic feet and an area of 9 square feet per head, encumbered with forms and desks.

Cubic space.—I have had the cubic contents of every apartment used by the inmates of each Institution measured. The details will be found in the Appendix (Table I.). I do not include the Dining Hall, which is in the Female Institution, because it is used by both sides. The *Boys* have an aggregate of 125,312 cubic feet, the *Girls* of 135,295 cubic feet, or 597 and 712 cubic feet per head respectively. In each of the three *Male Dormitories* there are 70 beds, which gives 385, 372, and 367 cubic feet per head in the low, middle, and top dormitories respectively, or an average of 375 cubic feet. The *Female Dormitories* are four in number, among which the 190 beds are thus distributed: 60 with 374 cubic feet each; 48 with 275 cubic feet; 41 with 259 cubic feet; 41 with 288 cubic feet; the average being 306 cubic feet. This is the only part of the accommodation in which the boys have more space than the girls. In the *Boys' School-room*, used by half the inmates at one time (105), the space per head is 216 cubic feet; in the *Girls' (95)*, it is 254 cubic feet. The *Boys' Sick-room* is a small bedroom, containing 2694 cubic feet, in which 4 beds are placed usually, but as many more are added on occasion as the floor will hold. The *Girls' Sick-room* measures 5044 cubic feet with 5 beds. This gives 673 cubic feet or less to the sick Boys, and 1008 cubic feet to the sick Girls. The Girls' sick-room is also much better suited for the purpose, having 3 windows as compared with 1. In neither Institution is there a *mortuary*. The bodies on which the post-mortem was made on 8th March were placed in what seemed to be a bedroom used by attendants, on the same landing as one of the dormitories. I have since attended a post-mortem on the girls' side, and the body was in a closet next to the sick-room, used as a drug store, and lighted only by a skylight! It certainly seems remarkable that such arrangements as those described for the sick and the dead should be tolerated in Institutions under Government Inspection.

General Sanitary Condition.—At the time of the outbreak all the wall-surfaces in the Boys' Institution were conspicuously dingy and in want of renewal, while on the Girls' side they were fresh and clean. The *Privy* in the Boys' courtyard is an iron trough privy in which the fæces accumulate, and were flushed out every second day and removed by the Cleansing Department. I ordered this to be done every day. The Privy in the Girls' courtyard is also a trough privy, but it is flushed out at least three times a day into the drains by the attendants. It is consequently much more cleanly and wholesome.

The difference between the *lavatory arrangements* in the two Institutions is also important. The boys' lavatory is a cold, damp, uncomfortable-looking place, without hot water at the taps, situated in the court-yard. To turn lads of low vitality, with weak chests, out of their warm dormitories to perform their ablutions there at 6 o'clock on a winter morning must be dangerous. The girls have washing places convenient to their dormitories on the same landing, where they are not exposed to chills.

The *drains and soil-pipes* of the girls' school were thoroughly overhauled and rectified under the supervision of this Department in the Spring of 1886, after an outbreak of Typhus Fever. In March last, after the present outbreak, the whole drainage system of the Boys' Institution was tested and inspected, and the following is Mr. Fyfe's report of the result:—

“13th March, 1888.

“The drainage system of the boys' workshops, school, and dormitories was smoke-tested to-day.

“The following are the defects which were noted:—

“Smoke issued in the W.-C. attached to the dormitory in the top flat, and from the joint at the top of the window outside; also, in the W.-C. apartment attached to the dormitory immediately beneath this, apparently from defective fittings at the jawbox. It also came up in considerable volume in the small private washing-house on the opposite side of the court.

“The sink in the closet attached to the lowest dormitory is connected to the soil-pipe below the seal, and the ventilation of the soil-pipe is insufficient. Inside of the seat of this W.-C. filth and dirt were found in considerable quantity. Below this W.-C. and bath apartment is the boys' lavatory, a long chamber having iron basins ranged along each side. There are six bell traps in this chamber. Two were lifted, and both were found to be choked with dirt, and consequently inoperative.

"An old disused waste pipe, four inches diameter, was found connected to the main drain running out to the south of the dormitories. It was built about two feet into the wall, and was quite open. *The main drain was thus being partially ventilated into the stones and mortar of the gable at the south end of the school-room.* At this end of the building, just at the stairs leading towards the south, the ground was opened. The soil and sand turned up were teeming with large white worms, which were crawling about in every direction. I understand that coffins containing human remains were found some time ago in the court attached to the girls' portion of the school when a portion of it was being dug up to lay the drains.

"The steam pipes which heat each of the three dormitories are connected to the drains, so that hot water and steam are discharged therein during heating time. This, of course, ought to be discontinued.

"I got a portion of the floor of the centre dormitory opened. The deafening is composed of ashes and builders' refuse, viz.—lime, stones, sticks, &c. Cobwebs were formed among portions of it; but no offensive smell could be felt. No ventilation is provided underneath the flooring of any of the dormitories.

"The main soil pipe from the water-closet attached to the dormitories is connected to the back gutter, and takes off the rain water. This soil pipe should be carried up full bore three feet above the roof, and a separate rain conductor ought to be erected in order to take off the roof water. The main drains are very deep, and quite inaccessible.

"(Signed)

PETER FYFE,

"Sanitary Inspector."

"ADDENDA, 14TH JUNE, 1888.

"Drain pipes in cellar under boys' lavatory were open at the joints, and all the bell traps in lavatory were choked; also, soil pipe of W.-C. (on left of passage leading through the main building to back court) was defective.

"All the defects in the drainage are now made good.

"The steam and hot water from the heating pipes are still discharged into the drains, which will assist in the rapid decomposition of the sewage, and the quick formation within the purlieus of the buildings of offensive gases.

"Nothing has been done to warm the boys' lavatory, which must be a chilling spot in the winter time.

"P.F."

The health record of these Institutions is bad. In the Annual Reports of the Government Inspector of the Certified Reformatory and Industrial Schools of Great Britain, the first of which ap-

peared in 1858 for the year 1857, we find evidence of this fact and of its association in the opinion of the Inspector with the radical defect of situation. The Convent, which ultimately became the Girls' School, is first referred to in 1862, and the Boys' School in 1868. The following are a few notes and extracts from the Inspector's remarks from year to year:—

1868. Referring to both Institutions—"The premises were clean and in good order. The chief drawbacks to them are that the space and opportunity for active exercise are very limited, and that they are so close to a large burial ground still occasionally used." (p. 91.)

1870. *Boys*.—"There was little illness in the house at the date of inspection, but since that time there has been a very serious outbreak of *Smallpox*." (p. 146.)

Girls.—"They looked healthy, bright, and cheerful, but there has been serious sickness in the year. * * * * The girls require more air, exercise, and freedom for moral and physical health and growth." (p. 146.)

1872. *Boys*.—"The exercise ground is but small. The children should be taken out for change of air and exercise as often as possible." (p. 160.)

Girls.—"The girls' school was visited by *typhus fever* in the early part of the year. No less than 100 girls stricken at once. Two deaths resulted, and two from consumption. * * * * The girls want more air and lively exercise. The situation of the school is not conducive to health. It should be removed to a greater distance from the town." (p. 161.)

1873. *Boys*.—"I found the boys in fair condition of health, though not very robust. They should be taken out for change of air and exercise as often as possible. One death in the year only. A few cases of *smallpox* had occurred without fatal effects among the boys, but the Superintendent's son did not survive the attack." (p. 168.)

Girls.—"The school maintains its internal efficiency. It is not healthy in point of situation. The young children require purer air and a greater amount of exercise and freedom." (p. 169.)

1874. *Boys*.—"Health and general condition.—Generally very fair. There had been a serious attack of *fever* in the preceding autumn, and 5 deaths had occurred in the present year, chiefly from lung disease." (p. 196.)

1875. *Girls*.—"Health and general condition.—The situation is not a healthy one for children; the girls have rarely enjoyed an average share of good health for any length of time. In the early part of the year there was an outbreak of typhoid [*typhus*] *fever*, affecting 20 girls. These were sent to the Fever Hospital

and treated there; this was followed by an attack of *measles*, 14 or 15 girls were affected. I found the general health restored on the day of my visit, but the physical state of the girls was not quite satisfactory. They want more fresh air and free exercise." (p. 181.)

1880. *Boys*—"Health and general condition.—The children are received in a very feeble condition, the constitution is very indifferent. It is difficult to build them up in strength and vigour; there were 5 deaths in the year. The children suffered a good deal from the cold in the early part of the year, and the deaths resulted chiefly from lung disease and consumption; 1 from heart disease. The boys looked bright and well on the day of inspection. The medical report was favourable." (p. 236.)

Girls—"Health and general condition.—The health of the children had been much tried since the last inspection. There had been 10 cases of *scarlet fever* and 2 of *measles*. Two deaths in 1880; 1 from consumption. The children on their arrival are very feeble and with constitutions much impoverished. At the time of inspection all the children were well and very many of them looked blooming and vigorous. A large majority very young." (p. 237.)

1881. *Boys*—"Health and general condition.—The children are very feeble on admission, and in the early part of the year there was a very serious mortality among those recently admitted; they seemed to be too weak to struggle against the severe weather of the early part of 1881. I came to the conclusion that the large dormitories were greatly at fault, and that in the winter it would be necessary to introduce some artificial heat. 10 boys died in 1881. This excessive death-rate demands the most serious attention on the part of the managers. Such a mortality is altogether abnormal and can be prevented by ordinary precautions, by merely supplying warm clothing, plenty of food, and warm apartments, accompanied with individual care and attention." (p. 239.)

Girls—"Health and general condition.—The girls had a healthy appearance. Several of them suffered from the extremely trying weather of the early part of 1881 from attacks of bronchitis and pulmonary disorders. Only two deaths in 1881; a few cases of ophthalmia. No sick cases on day of visit. Children thriving physically." (p. 240.)

1882. *Boys*—"Health and general condition.—A better medical report this year. Only one death in 1882 against ten in 1881. The winter happily was very mild. Cold is the deadliest enemy of the poor enfeebled children received. Keep them warm by night and by day, and you may preserve their lives." (p. 256.)

Girls—"Health and general condition.—Very fair. Most of the children looked remarkably well. Two deaths in 1882.

A few cases of ophthalmia; some acute cases of bronchitis and congestion of lungs; a little rheumatism also; one case of *enteric fever*. A good many bronchial attacks in the early part of the year." (p. 256.)

1883. *Boys*—"Health and general condition.—A great deal of special attention is now paid to the delicate and the ailing. The Medical Officer calls daily. Three deaths in 1883 from lung disease; two suffering from pneumonia at the date of my visit. Many very feeble on admission. A few cases of weak eyes; one from hip-joint disease. Boys generally doing well, bright and active, and with plenty of spirit. Food and clothing apparently sufficient." (p. 270.)

Girls—"Health and general condition.—Many of the girls very young, and when admitted very feeble, and without any constitutional strength. Three deaths in year from lung disease. Children very subject to pulmonary complaints. Children carefully nurtured and very kindly treated. A large number looked healthy and vigorous, well fed and clothed, and of good physical appearance. Very little sickness. Medical report, except as to delicate children, satisfactory." (p. 271.)

1884. *Boys*.—"Medical report favourable on whole. * * * Several cases of pneumonia, the most fatal in its effects here." (p. 262.)

1885. The Chief Inspector refers to "a very serious outbreak of *typhus fever* at an Industrial School in Abercromby Street, Glasgow, for the reception of Roman Catholic girls." After detailing the circumstances, which are given in quotations below, from Mr. Rogers' Report, he adds—"The situation of the School is not good, being in a low and crowded part of the town, and some of the sanitary arrangements of the building are open to objection." (p. 12.)

Boys—"Health and general condition.—The school is very subject to epidemics. In July, 1884, there was a severe attack of *smallpox*—11 cases. All the boys were vaccinated or re-vaccinated after the attack. In November, 1884, 11 boys were suffering from *measles*. Several cases of lung disease, a most fatal complaint in this school; several cases of ophthalmia. Boys very feeble on admission, with no constitutional strength; these younger boys need a separate establishment and female care. Four deaths in 1885—a large mortality. No sickness in the house; boys looked fairly bright and active, many very young." (p. 273.)

Girls—"State of premises.—Premises in very good order and repair. One or two of the dormitories open to objection; some alterations required on sanitary grounds. Good laundry and drying-room. Capital play-shed. Yard newly pitched. Much has been done of late to place the school on a satisfactory footing, but the situation is an unhealthy one, and contagious or infectious disease is constantly at its doors.

“Health and general condition.—Several cases of ophthalmia, and two cases of rheumatism ; several of bronchitis and pneumonia. In November and December, 1884, six cases of *measles*. In the early part of 1885 several cases of bronchitis and pneumonia. In October, November, and December, 1885, the school suffered from a prolonged attack of *typhus fever*; there were 65 cases in all. Happily it was of a mild type, but two girls died, and one of the attendants, a Sister of Charity, also succumbed. The outbreak was the subject of special investigation and enquiry. It was probably introduced into the school, but was allowed to get strength before it was fairly grappled with. The premises have been carefully examined, the sanitary arrangements looked into, and measures of prevention adopted. But the school is badly situated, and should be removed into the country. There were five deaths in the year.” (p. 274).

1886. *Boys*—“Health and general condition.—I cannot say that the situation of the school is a healthy one. The boys are constitutionally feeble on admission, and require female care and superintendence up to a certain age. They are very subject to pulmonary complaints, and very often succumb to such attacks. There were two deaths in 1886 ; one with diseased bone of foot, which he was obliged to lose ; several cases of pneumonia and bronchitis in the early part of the year. Boys are properly cared for, and looked bright and cheerful. I saw no indications of neglect ; on the contrary, the children are treated with much kindness and attention.” (p. 287).

Girls—“State of premises.—I found that, in consequence of the alarming outbreak of typhoid [*Typhus*] *fever* in the school, in November, 1885, the sanitary condition of the house had been much improved. The whole house had been renovated, the drainage carefully examined, and everything objectionable removed. The dormitories were clean and sweet, new bedding supplied, and the whole house purified and cleansed as far as possible.

“Health and general condition.—The health of the children since the serious outbreak of 1885-6 had been good. One death in the year. The sick-room was unoccupied on the day of my visit. There had been a few rheumatic cases, and some cases of ophthalmia and bronchitis. The children had a healthy appearance generally.” (p. 289).

The burden of all these official reports is the unhealthiness of these schools, their unwholesome position, their repeated invasion by infectious disease which always spreads. This shows want of sufficient air-space both within and without. Pneumonia and other lung diseases are chronically prevalent from the same cause, and especially severe among the boys. Ample testimony is borne to the care bestowed upon the inmates, and to the numerous

alterations and rectifications of drainage and other internal improvements, but these do not touch the radical defect of these Institutions, and there has been no real elevation of the general standard of health.

Death-rate in St. Mary's.—In the Appendix (Table II.) will be found a statement compiled from Tables in the Government Inspector's Annual Reports, showing the average number of inmates and the number of deaths in each Institution for the 10 years, 1878-87, inclusive. I have chosen the last 10 years so as to give the Institutions the benefit of all that has been done to improve their condition. The result is that in the Boys' School there have been 36 deaths (*i.e.*, 3·6 in an average population of 226·7) or a mean annual death-rate of 15·9 per 1,000 inmates; in the Girls' School 25 deaths (*i.e.*, 2·5 in an average population of 190), or a mean annual death-rate of 13 per 1,000 inmates. For comparison I have also compiled a similar statement from the same source for the Mossbank Industrial School for Boys and the Rottenrow Industrial School for Girls which was transferred in June, 1881, to Maryhill. These Institutions receive the same class of boys and girls from the same city, the only difference which determines the allocation of the children being one of religion. The result is that in Mossbank Boys' School there had been 42 deaths in an average population of 385, or a mean annual death-rate of 11 per 1,000 inmates; in Rottenrow (now Maryhill) Girls' School 12 deaths in an average population of 211·5, or a mean annual death-rate of 5·7 per 1,000 inmates. This comparison requires no comment. The extreme unhealthiness of the St. Mary's Institution may be illustrated by another comparison. Taking the Boys and Girls together we find that there have been 61 deaths (*i.e.*, 6·1 in an average population of 416·7), or a mean annual death-rate of 14·6 per 1,000 inmates. In the worst district of Glasgow, *viz.*, Bridgegate and Wynds, in the 3 years, 1880-1-2, the death-rate per 1,000 of the population between 5 and 20 years of age was 12·5, or 2 per 1,000 *less* than this Institutional death-rate of a population aged between 5 and 15 years. The data at my disposal do not admit of stating the mortality for exactly the same period of age, but the inclusion of the five years, 15 to 20, tends to raise the district death-rate quoted, so that the comparison as it stands is favourable to these Institutions, yet this is the astounding result. Taking Mossbank and Maryhill Schools we

find that there have been 54 deaths (*i.e.*, 5·4 in an average population of 596·5), or a mean annual death-rate of only 9 per 1,000 inmates ; which is 3·5 per 1,000 *less* than the district death-rate, and 5·6 *less* than the St. Mary's death-rate.

The most fatal diseases in St. Mary's.—In the Appendix (Table III.) will be found in detail the registered cause of each death in each Institution in the last 10 years, with the duration of illness and age of patient, all extracted from the Registrar's books. Out of a total of 36 deaths among the boys there were 16 from Phthisis, 6 from Pneumonia or Pleuro-pneumonia, 4 from Congestion of the Lungs, and 1 from Bronchitis. Out of a total of 25 deaths among the girls there were 10 from Phthisis, 3 from Bronchitis, 2 from Congestion of the Lungs, and 1 from Pneumonia. Therefore 75 per cent. of all the deaths among the boys was caused by various diseases of the Lungs, and 64 per cent. of all the deaths among the girls. Combining the two sexes 70·5 per cent. of all the deaths was caused by Pulmonary Diseases. Again, turning to the most unhealthy district of Glasgow, viz., Bridgegate and Wynds, for comparison, I find that in the three years 1880-1-2, 41 per cent. of the total deaths between 5 and 20 years of age were caused by diseases of the Lungs. Separating Phthisis from Acute Diseases of the Lungs I find that the comparison stands thus :—

	Institutions.	Worst City District.
Phthisis,	42·6 per cent.	21·7 per cent.
Acute Diseases of Lungs, .	28 do.	19·3 do.

The rapidity with which some of these diseases proved fatal to the children, especially the boys, is remarkable, *e.g.*, Congestion of the Lungs was fatal to a boy of 11 years in 1 day, and Pleuro-pneumonia to boys of 9 years and 10 years in 4 days.

Frequency of Epidemics in St. Mary's.—The quotations from the Inspector's annual reports show that both Institutions have been repeatedly invaded by various epidemics. *Smallpox*—In 1870, in 1873, and in 1884, there were outbreaks of smallpox, on each occasion among the boys. *Typhus*—There have been 3 severe epidemics of typhus, all among the girls. In 1872 “no less than 100 girls were stricken at once,” and 2 died. In 1875 there were 19 cases. On that occasion I reported as follows to the Local Authority,—“I have had the dormitories in this Institu-

tion measured, and find that in all there is a minimum of cubic space, and in one, indeed, positive overcrowding—there being little more than 200 cubic feet per bed. I have addressed myself to the Superintendent of the schools on the subject, and have seen the local agent of the Inspector of Reformatory and Industrial Schools.” In 1885 there were 70 cases; 2 girls died and 1 of the Sisters of Charity. *Scarlet fever* invaded the boys in 1873 and the girls in 1880. *Measles* invaded the boys in 1877 and 1884, and the girls in 1875 and 1884. Free intercourse with friends and relatives, and the absence of a probationary ward in which new admissions could spend a period of quarantine before joining the others, make the occasional importation of infection inevitable. Still, if there was no overcrowding and if proper sick-room accommodation existed, the disease thus imported would not spread as it always does. Those epidemics of typhus, which have thrice occurred in the girls’ school, are sufficient of themselves to bring discredit upon the Institution.

Meteorology.—A table showing daily progress of disease, with meteorological data, will be found in Appendix (Table IV.). This outbreak occurred in the spring. The first and fatal cases on 2nd and 3rd March were preceded by a period of cold, dry, sunless weather, with east and north-east winds; the mean daily temperature averaging about 36° F. The next fatal cases on 7th March occurred after two days of west wind, with rain and mean temperatures of 44° to 45° F. This change continued for the three following days, which produced the bulk of the cases. Then occurred three weeks of east and north-east winds with occasional rain and more sunshine on the whole, but with low mean temperatures, considerably below or but little above freezing and very variable, during which cases occurred, 1 or at most 2 per day, with intervals of immunity. Probably all that can be inferred from these facts is that the weather was trying for weakly children and well calculated to chill the surface and produce internal congestions.

Health of the Neighbourhood.—In the tenements of flatted dwelling-houses surrounding the block containing St. Mary’s Institutions, there are 158 dwellings, viz., 38 of 1 apartment; 85 of 2 apartments; 27 of 3 apartments; 7 of 4 apartments; and the residence of the clergy, 14 apartments; the number of inhabitants

being between 700 and 800. In the months of February, March, and April of this year there were *only two deaths* registered in this population, viz., a female, aged 65 years, on 16th April, of pneumonia, after an illness of 10 days; and a male, aged 52 years, of phthisis pulmonalis, on 17th April, after an illness of $3\frac{1}{2}$ years. There is therefore no evidence of any coincident disease of the St. Mary's type among those living within a few yards of the Institutions.

Health of the City.—The Registrar-General returns the weekly death-rate, and the number of deaths from Bronchitis, Pneumonia, and Pleurisy, in the City, for the six weeks, covered by the Meteorological Table in the Appendix, thus:—

	Death-rate.	Pulmonary deaths.
Week ending 25th February,	26·9	69
" 3rd March,	27·5	76
" 10th "	29·4	94
" 17th "	26·9	72
" 24th "	27·2	71
" 31st "	27·4	77

The week ending 10th March, which was the centre of the St. Mary's outbreak, was, therefore, marked by a sudden and solitary increase in fatality of acute diseases of the lungs, over the whole City.

Summing up the results of this investigation, we find that the St. Mary's Industrial Schools are situated in a densely populated district of the City; that they are enclosed by surrounding tenements and other large buildings, along with a graveyard which was in 1875 described as "greatly overcrowded with bodies, and kept in a state of rank disorder," and in which have since been interred 577 bodies; that the free space attached to both, and available for exercise, is small; that the internal air-space in both is deficient; that the inmates are children between 5 and 15 years of age, who are the waifs of a large city, weak in constitution, tainted with a proclivity to scrofulous diseases, and generally of low vitality; that the death-rate is in both higher than that of other Industrial Schools which receive the same class of Glasgow children, and higher than that of children of the same age living in the lowest district of Glasgow; that the proportion of the total deaths caused by pulmonary

diseases is enormous, and higher than among children of the same age in the worst district of Glasgow; that, in the words of the Government Inspector, "contagious or infectious disease is constantly at their doors," and especially that there have been repeated epidemics of Typhus Fever, a certain indication of, and attendant upon, overcrowding. This is the sanitary status, and the vital results associated therewith, as regards both institutions; but comparing one institution with the other, we find a marked difference to the disadvantage of the boys' school—a difference of such a kind as to suggest a probable explanation of the event for the cause of which we are in search. The overcrowding is much greater in the boys' than in the girls' school, *i.e.*, the external free space is much less, the internal air space is much less per head; the internal arrangements are more defective, the accommodation and general sanitary condition of the building inferior; the general mortality among the boys is higher; the proportion of the total deaths caused by pulmonary diseases, and especially by acute diseases of the lungs, is considerably higher. The outbreak of March was in its nature a febrile disease, tending to implication of the lungs, and especially to pneumonia. It seems identical with a disease which has been observed in other similar institutions, more or less detailed accounts of which will be found at the end of this report, in all of which the observers had a difficulty in assigning it a place in nosology, but in all of which it was associated with insanitary conditions of the nature of aerial contamination. It suggests a specific poison, from family resemblance in explosive character, local limitation, and clinical features, to other well-known typical diseases of the epidemic and infectious class. No specific micro-organism was discovered in this, or has been, so far as is known, in any other like outbreak. The rapid fatality in the fatal cases shows that this poison, though in the cases in which life was not at once extinguished it tended to expend itself upon the organs of respiration, was the cause of the disease. The local disease was the result of a constitutional infection, which was capable of killing without the local disease. The *post-mortem* appearances pointed to a specific poison allied to that of enteric fever. Such as they were, they were distinctly lesions of the mesenteric glands, and of the glandular system of the small intestines. The experience of the Fever Hospital is strongly suggestive of a causal affinity between certain forms of pneumonia and enteric fever. The two diseases are frequently confused,

both in their diagnosis and local incidence. This observation, as well as the present epidemic, raises a strong suspicion that we must enlarge our conceptions of the morbid manifestations which are to be regarded as proof of the influence of air contaminated with organic effluvia. If so, we can no longer hold that the absence of enteric fever warrants us in concluding that known impurity of the air from sewage emanations, for example, is innocuous. The prevalence of acute pulmonary diseases may be the result. The presence of "Pythogenic Pneumonia" and "Epidemic Pneumonia," in nosology, and the circumstances of the well-known outbreak in the East Sheen Boys' School, and other similar recorded outbreaks, give this observation support and established recognition.

In the course of the outbreak the patients at Belvidere were seen by several eminent professional friends at my request. Professor Gairdner was inclined to regard them as cases of "Influenza of a malignant type;" Dr. Finlayson had no doubt that they were examples of what has been called "Epidemic or Infectious Pneumonia." Dr. Samson Gemmell had the advantage of seeing all the cases, having accompanied me repeatedly in my visits to the School as well as to the Hospital, and seen the cases at all stages, within an hour or two of seizure as well as subsequently. I have therefore asked him to give me in writing his general impression, which he has done in the following short memorandum:—

" NOTE ON THE CLINICAL ASPECT OF THE DISEASE.

" By Prof. GEMMELL, *Anderson's College*.

" It seems to me evident that in the recent epidemic in St. Mary's School we had to deal with a disease allied to the acute specific fevers. The sudden onset with headache, sickness, shivering, and other signs of profound constitutional implication point decidedly in this direction. Moreover, the speedy issue in the four fatal cases (three of them dying after a few hours' illness), finds its closest analogue in the so-called malignant forms of epidemic disease, which terminate in some instances so rapidly that they would baffle diagnosis were it not for clear association with cases having more ordinary manifestations. The two *post-mortem* examinations revealed no specific lesions, but the extremely fluid character of the blood in one case, and the general tendency to enlargement of the spleen and mesenteric and intestinal glands in both, are quite in keeping with the idea of acute specific poisoning, although the microscopic examination of the blood and organs revealed no micro-organisms.

“ In view of the frequent occurrence of inflammation of the lungs among the patients, the question of the disease being ‘infectious’ or ‘epidemic’ pneumonia early suggested itself. This is a disease apt to arise under insanitary circumstances, such as overcrowding, deficient ventilation, and other hygienic errors apt to induce infectious diseases in general. And no doubt in this School the sanitary conditions, especially with regard to air-space, as indicated both by the Government Inspector and Dr. Russell, are defective; and pneumonia, not, however, as an epidemic, has been a frequent visitant in recent years. But it must be borne in mind that out of the 66 cases comprised in the epidemic only 17 had decided pneumonia. Other 8 were doubtful cases (some of them very doubtful, the temperature being the only suggestive fact), but the majority of the patients presented no traces of pneumonia at all. No doubt in many of these the disease was of short duration and unattended by high fever, but the general symptoms otherwise were such as to reveal clearly a close ætiological affinity, if not absolute identity, with the more severe cases. They seemed all the victims of the same poison, although in some, owing probably to personal idiosyncrasy aided by favourable atmospheric conditions, it issued in pneumonia.

“ It is to be remarked also that the clinical features of the pneumonic cases do not strengthen the idea of the disease being ‘Epidemic’ pneumonia arising from insanitary surroundings. There was no prodromal stage; the local lesion revealed itself early; the disease was unassociated with typhoid phenomena; terminated in crisis, in every instance, within a week; the convalescence being rapid, and the restoration of the lung speedy and complete. In no instance did death occur. Such are not the characters of the infective type of pneumonia; and, indeed, apart from their epidemic association, any of the cases might have been selected as exhibiting most of the typical characters of acute pneumonia as it occurs sporadically.

“ It is impossible with our present light to dogmatise regarding the exact nature or genesis of the disease. The question as to whether it might not be an anomalous manifestation of enteric or typhus fever was suggested, but nothing transpired to encourage such an idea. The circumstances pointed clearly, of course, to a local origin of the disease, and it is no matter for wonder that it told with such severity among boys of low constitutional vigour living under unwholesome circumstances.”

What ought to be done?—The important question which is the natural outcome of the melancholy history of the St. Mary’s Schools is this:—What ought to be done to improve their sanitary condition?

A. *Removal of the Institutions to the suburbs.* This is the only radical cure. This step has been from the time of their establish-

ment on their present site urged by the Government Inspector, but they remain. The reason is that referred to in his Report for 1863—"They have to contend with the usual difficulty of institutions of this kind for Catholic children in England and Scotland, viz., very scanty pecuniary resources" (p. 69).

B. It is surely obvious, nevertheless, that something must be done. (1) The only control which Government can exercise is by *reducing the number of inmates for which they are licensed*. Some sacrifice must be made. The children suffer from air-hunger. If they cannot be transferred to the country, then an endeavour must be made to reduce their number and thereby raise the proportion of such air-space as the site affords. At present they are exactly in the position of the inmates of an overcrowded house in which, while there is every condition which induces disease, there is no possibility of separating the diseased from the healthy when in life, or even the dead from the living.

(2) Such a high death-rate necessarily means an equally high sick-rate. Yet there is practically no accommodation for the sick in the Boys' School, and inadequate accommodation in the Girls' School. The number of inmates should be so reduced that space for *a large hospital ward* may be obtained. Skilled attendance ought to be provided by night and by day for those under treatment there, so that such a thing as a child dying unseen should be impossible; not to speak of the inevitable inference that if children die unseen those who survive must be neglected. In the light of medical opinion now-a-days as to the communicability of Phthisis, the prevalence and fatality of this disease in those Schools, taken along with the want of commodious apartments for their treatment, raises the gravest suspicion that Phthisis is not only induced by the prevailing air-hunger but is propagated by infection. Care is prescribed as to the disposal of Phthisical expectoration by medical attendants in their private practice, and wherever it is possible isolation in bed and living arrangements is thought to be an ordinary precaution.

(3) A *Mortuary* outside the main building, away from the sleeping and living apartments, must also be provided. It is bad enough that in the small houses of Glasgow the dead should be laid out beside the living; but it is intolerable that in a public Institution corpses should be stored away in drug-stores and bedrooms.

(4) A *Probationary Ward* is also wanted in both schools. Children when admitted may bring with them the seeds of

infectious disease, and should be kept apart for three weeks under observation.

(5) The boys require a *Play-room* for winter and wet weather. Anything more unnatural and unwholesome than the present practice of penning those children up on such occasions in the school-room can scarcely be imagined.

(6) Hot water ought to be introduced to the taps in boys' lavatory, and heating pipes so as to have the place warmed in winter before the children leave their warm dormitories to wash.

(7) Every child, both male and female, ought to have flannel underclothing during winter and spring. At present only the delicate ones are said to have flannels, but all are delicate. When they become so specially delicate as to attract attention it is too late to begin to clothe them warmly.

(8) Another step, which it is within the power of the Local Authority to take, and which ought to be taken at once, is *absolutely to close St. Mary's Cemetery*, and to make arrangements for putting the ground in decent order. It is now, as in 1875, "in a state of rank disorder," and is used occasionally as an exercise ground for the children!

SIMILAR OUTBREAKS IN SIMILAR INSTITUTIONS.

The allusions to the extraordinary occurrence at St. Mary's, published in the Medical Journals, brought to me two very interesting communications descriptive of apparently similar outbreaks in similar Institutions, and my attention was also called to another published account, all which I append.

1. *Roman Catholic Reformatory for Boys, Westthorn, Glasgow.*

While the St. Mary's disease was in progress, Dr. Scott, of Tollcross, examined the patients at Belvidere and addressed a letter; under date 16th March, to Dr. Gairdner, who had also seen those cases, and was inclined to regard their disease as "Influenza" of a malignant type. I am permitted to publish the following extracts:—

"I have been Medical Officer of Health to the Roman Catholic Reformatory for Boys at Westthorn for the last twelve years, and have been much interested in the outbreak of this so-called 'fever' in Abercromby Street. I called at Belvidere to-day, and in Dr. Allan's presence I carefully examined several of the older patients, and have come to the conclusion that they are suffering from a form of disease which is exactly analogous to one with which I have had to deal among our own boys.

"About ten years ago, at this very season of the year, when the weather was intensely cold, 10 or 11 of the boys were brought into the Hospital with what I thought at the moment incipient symptoms of typhoid fever. The history of that attack was something like this:—On this cold morning the boys rose and breakfasted in their usual good health. After having been sent out to their work in their various divisions, one after another was noticed to be suffering from cold and was sent in by their respective masters to the sick-room. Within three hours thereafter these boys gradually assumed a semi-comatose condition, and one of them especially became affected with a low muttering delirium during the time I was even making an examination of his fellows. They complained of no pain, wanted to be left alone, and their temperatures ranged from 104° to 105° . Only one had diarrhœa, and he succumbed in 9 hours from the onset of the disease. The boy to whom I have already referred as unconscious died within a few hours. With the others the temperature remained at pretty nearly 105° (its highest stage) for three or four days, during which time there was no appearance of diarrhœa, spots, rash, or spit, except in one case in which there was a little pulmonary congestion. At the end of that time the temperature fell to nearly its normal condition, and the boys in two or three days thereafter regained perfect health.

"Since then another epidemic took place about two years ago in which all affected made a good recovery. On several occasions we have had sporadic cases. One terminated fatally after four hours' illness. In every case the onset of the disease could be traced to—*not a rigor*—but a chill which was long-continuous and depressing. During intensely cold weather these boys have to be watched with extreme care. Many of them are constitutionally unhealthy, and from the state of their health and condition of their blood they seem to be quite unable to stand severe cold. Since our first serious outbreak we are specially careful that the delicate boys are clad with flannel and are not suddenly exposed to extreme cold. Our treatment with regard to these has been warm baths, warm diluent drinks, and some stimulant, and experience has shown that if the capillary circulation of the skin be not restored within the first 3 or 4 days of the onset of the attack, the patient dies of apparent blood poisoning.

"In my opinion the disease is caused by defective capillary circulation and consequent hyperæmia of lungs, liver, spleen, and intestines. I am not satisfied that the disease is infectious, nor can I consider it as pyogenic pneumonia, and I am inclined to think from the cause of the disease and the condition of the patients that it is somewhat like influenza, and that the septic poisoning is auto-innoculative.

* * * * *

"The mention of the old graveyard in connection with Abercromby Street School leads to the consideration of the septic

influence of Dalbeth graveyard. But why should these germs be most virulent during the coldest part of the year and be entirely innocent during the hot summer months when our boys are working and playing in its immediate neighbourhood, and that too with large open pits for graves?

* * * * *

“ Among those affected in our school only one showed symptoms of pneumonia.”

* * * * *

2. *Birkdale Roman Catholic Reformatory, Southport.*

“ 50 Liverpool Road, Birkdale,
“ Southport, March 23, 1888.

“ DEAR SIR,

“ Excuse delay, but I could not reply earlier to your letter.

“ As you suggest we have had at the Birkdale Reformatory a series of cases evidently of the same kind as those you report upon at the Glasgow Industrial School. Since Jan. 3rd of last year we have had 3 deaths.

“ I. The first case occurred on Jan. 3rd, '87, and I was with the boy for an hour and a half before death. From notes taken at the time I extract the following:—

“ ‘ I arrived at 10.20 a.m. and found the boy in a state of profound coma, the breathing being slow and stertorous, the pupils dilated and absolutely insensitive to light, flushed face, bounding pulse, 80; temp., 101°. The chest full of loud, coarse mucous rales, which increased progressively to the time of death. The breathing became slower, the face more flushed, and at 11.45 the boy died asphyxiated, the face finally becoming purple and the heart beating strongly and regularly up to the last.’ (About 11 o'clock he vomited bile and mucus.) No inquest or post-mortem.

“ This boy commenced vomiting in the dormitory about 2 or 3 a.m., having previously been in good health and eating well. A master saw him about 7 a.m. and found him ‘languid, with a weak, slow pulse.’ He said he had no pain, but when he got up he could only walk with the assistance of another boy. At 7.20 he was seen again. He was in the infirmary lying on his bed and was with some difficulty roused. However, he stood up and was undressed and put to bed. At 8 a.m. ‘he appeared to be in a nice comfortable sleep.’

“ II. The second fatal case.—I did not see this boy before death. He took ill in the afternoon with vomiting and heaviness, and at 11 p.m. temp. was 104°. About 2 a.m. he was found dying and was dead when I arrived.

“ *Post-mortem.*—Brain and membranes congested. The lateral ventricles nearly full of pink serum; lungs intensely congested

(recent); no consolidation; stomach contained $1\frac{1}{2}$ pints of mucus and bile, as certified by county analyst. Bowels empty; kidneys healthy.

"III. Case 3 died recently.—I saw him the evening before his death—11 p.m. Temp. 100° . Pulse 96; resp. 24. There seemed very little the matter with him beyond a simple feverish attack. At 4 a.m. he vomited mucus and bile, and shortly afterwards was found dead.

"*Post-mortem*.—Brain congested; lateral ventricle on left side half full of pink serum; lungs, stomach, liver, kidneys, congested; right heart gorged; stomach empty; bowels rather constipated.

"I now give a case which I saw recover, and reproduce my notes verbatim:—

"*J. M., 17 years*.—First saw him at 9.15 p.m.; pain in head; perfectly conscious, but dazed; pupils rather dilated; sluggish; pulse 84, strong, regular; temp. $101^{\circ}8$; vomited mucus and bile,

"Rapidly became less conscious, and at 10 p.m. pulse 100, weaker, irregular; temp. $100^{\circ}4$.

"10.10. Perfectly unconscious; corneæ insensitive; pulse 92; temp. $100^{\circ}2$; breathing stertorous. Turpentine enema; 5 grains, and again 4 grains calomel; cloth wrung out of boiling water applied to nape of neck with friction, and then blistering fluid; mustard to calves.

"10.30. Pulse 72; temp. $99^{\circ}6$.

"11.15. Temp. 100° ; becoming more conscious; corneæ sensitive. Made a good recovery.

"IV. In addition to these cases we have had, since January, 1887, 23 cases falling ill singly, *i.e.*, no two or more boys took ill on the same day, but at varying intervals such as one, two, three days, a week, or two weeks, and in the last case five months. There were two types of this epidemic, *viz.*, the chest type and the head type. The former began as usual with the vomiting, headache (not very severe and lasting), and developed a broncho-pneumonia pleurisy or simple bronchitis which cleared away in two or three days. In the broncho-pneumonic cases immense expectoration of frothy bloody sputa.

"The head cases were more obstinate and lasted longer. The headache was very severe, and generally was all over the head. One case displayed nothing but a badly-congested throat with yellow mucous patches, and a temp. of 104° , which was followed by a peculiarly copious desquamation.

"By careful examination at the hands of experts we have excluded from the possible causes water, drains, food (meat, milk, bread).

"Ventilation is *said* to be good, but I think we are too well ventilated in the dormitories and too badly in the school-room, which is also used as a play-room. We have about 200 boys, and these boys spend a couple of hours in the school-room before going

to bed (in the winter). The room then becomes stifling hot, stuffy, and fetid. In sheer despair I have been driven to imagine that this condition of things may amount practically to overcrowding, and that the production of some bacterial poison similar to Typhus may result. We still require a certain and unknown condition of body.

“Disjointed facts.”—There is *no* evidence of contagion in these cases. All the deaths have occurred in cold (very cold) weather during a north-east wind. Our series of cases last year finished in August, but earlier on we observed that a warm spell of weather following a cold one put a stop to the series. When the weather became colder they began again. Some slight ones, however, did occur in the warm months.

“I have thus put together in haste such information as I think may interest you, but I can, if you wish, furnish you with more or less copious notes of every case we have had. My time is at present very limited, and I trust, therefore, that you will excuse my very imperfect account. I have some reason for thinking that these cases are more common in Reformatory and Industrial Schools than is generally believed. On referring to the Journals of the Birkdale Reformatory, I find an account of a small epidemic (eight cases, with one death) of the same kind, about 12 years ago.

“I should be glad of any further communication on the subject.

“I am, DEAR SIR,

“Faithfully yours,

“(Signed) FRANCIS NEWSHAM,
M.R.C.S.E., V.C.

“Dr. RUSSELL,

“Medical Officer, Glasgow.”

Under date 14th June, in giving permission to publish his letter, Dr. Newsham states that the tobacco theory is also in favour among the Birkdale Officials. The vice is general there, but he remarks that “the Clarence Reformatory Ship has never experienced a similar visitation, and I am told that the boys there are undoubtedly more given over to the habit of chewing than the Birkdale boys.” He then adds:—“One omission of some importance I made in my last letter to you, and that was, that at Birkdale they are not in connection with any system of sewage, but use the dry earth system, and collect the liquid refuse in tanks, from which it is pumped on to the farm. The soil, also, after being collected in a heap, at some considerable distance from any of the buildings, is mixed with other materials, and spread upon the land. Now we have not suitable soil for the dry earth system, as the Reformatory was built on pure sand, and the

cultivated soil, even now, is in appearance nothing but sand. To remedy this fine ashes are used. But against all inferences under this head, we have the fact that the deaths and worst cases are nearly all among the *Shoemakers*, and scarcely any cases at all, and no deaths, among the farm lads."

3. *Roman Catholic Poor Boys' School or Orphanage.*

In a paper entitled "Clinical Notes on a Febrile Epidemic Illness at a School" read by Dr. Edward Seaton, 23rd October, 1885, before the Clinical Society of London and published in volume XIX. of the Society's *Transactions*, he gives a careful history of an outbreak of peculiar disease in a "Roman Catholic Poor Boys' School or Orphanage, situate in the country near London." There are 665 inmates, of whom 157 were attacked and 7 died, in June, July, August, and September, 1885. The disease was strictly confined to this school and did not affect attendants, &c. In five cases there were second attacks after considerable intervals of perfect health. The following is Dr. Seaton's summary of the symptoms:—

"The group of symptoms which characterises this epidemic clinically is as follows:—Suddenness of attack without any premonitory symptoms. Attack commencing with rigors and severe frontal headache, followed in a few hours by pyrexia, vomiting (often severe) without diarrhœa, the acute stage being further marked by scantiness of urine and almost complete absence of chlorides. Rapid development of the crisis, the fatal cases terminating in twenty-four hours, and (in the uncomplicated cases) defervescence commencing in two or three days in the slight cases, and in four or five days in severe cases. The fall of temperature being generally simultaneous with the appearance of a herpetic eruption on the upper lip, and perspiration, but no marked sweating. Earache frequently occurring towards the end of the fever, and sometimes being followed by otorrhœa. Absence of any other local pains except those due to the straining of the muscles in vomiting. The duration of illness generally short and not exceeding four or five days, unless complicated with pneumonia. Surely a disease accompanied by so well-defined a group and train of symptoms requires a distinctive name as much as typhus fever or ague!"

He appends a clinical history of a typical case ending in recovery, which might be that of one of the St. Mary's boys, uncomplicated with pneumonia. He gives another history of a case which proved fatal in twelve hours, which also closely resembles a St. Mary's

fatal case. Of the 7 fatal cases, 6 terminated within twenty-four hours. The frequency of rigors, the greater persistency of vomiting, the more general suppression of chlorides in the urine, the association of the herpetic eruption with defervescence more than with the pyrexial stage, and the occurrence of earache and otorrhœa are the only points in which Dr. Seaton's disease deviates somewhat from the St. Mary's. As to nosology, Dr. Seaton says it "may be called 'synoque' (Devasse), 'ephemeral fever,' or 'herpetic fever,' names which have been used to designate a variety of continued fever, characterised by symptoms similar to those of the disease which in this case assumed an epidemic form." As to causation it will be observed that this outbreak occurred during summer, not as in St. Mary's, Westthorn, and Birkdale during cold weather. In the discussion which followed the reading of Dr. Seaton's paper, Dr. Bridges, Medical Inspector of the Local Government Board, attributed the disease to "exhalations from the sewage-charged soil," earth-closets being used in the institution, and their contents carelessly distributed over the attached ground. A similar system was in use at Birkdale.

EPIDEMIC NEAR LEICESTER.

In the *Edinburgh Medical Journal* for June, 1886, there is a paper entitled "History of an Epidemic," by W. B. Garvin, L.R.C.P. & S.Ed. It refers to a febrile outbreak in the village of Ansty, near Leicester. The history is very meagre, but it seems to have resembled these outbreaks in many points. There were over 100 cases, chiefly among the young, 2 fatal within 24 hours, the rest recovering in a few days. Dr. Garvin has the same difficulty in naming his disease, but concludes: "It is clear to me that this epidemic was caused by the filth of Ansty. Of filth as the origin I am positively convinced. In the absence of a diagnosis I shall content myself by calling it sewage fever."

APPENDIX.

TABLE I.

AIR-SPACE OF APARTMENTS, ST. MARY'S ROMAN CATHOLIC INDUSTRIAL SCHOOLS.

Boys.

210 INMATES.			Cubic Feet.	Cubic Feet.
School Room, . . .	61 ft. 10 in. × 30 ft. 4 in. × 12 ft. 1 in.	= 22,664	22,664	
Low Dormitory, . .	75 ft. 0 in. × 30 ft. 4 in. × 11 ft. 10 in.	= 26,921	} 78,637	
Mid do., . . .	74 ft. 9 in. × 30 ft. 3 in. × 11 ft. 6 in.	= 26,004		
Upper do., . . .	75 ft. 0 in. × 30 ft. 3 in. × 11 ft. 4 in.	= 25,712		
Sick Room, . . .	14 ft. 9 in. × 16 ft. 0 in. × 11 ft. 5 in.	= 2,694	2,694	
Tailors' Shop, . .	26 ft. 0 in. × 14 ft. 10 in. × 9 ft. 11 in.	= 3,824	} 21,317	
Paper-Bag Room, .	28 ft. 1 in. × 14 ft. 0 in. × 10 ft. 0 in.	= 3,932		
Shoemakers' Shop, .	20 ft. 9 in. × 14 ft. 0 in. × 10 ft. 5 in.	= 3,026		
Firewood do., . .	{ 56 ft. 0 in. × 15 ft. 9 in. × 9 ft. 3 in. } { 56 ft. 0 in. × 7 ft. 10 in. × 5 ft. 5 in. }	= 10,535		
Total,				125,312

GIRLS.

190 INMATES.			Cubic Feet.	Cubic Feet.
School Room, . . .	{ 50 ft. 7 in. × 26 ft. 9 in. × 13 ft. 0 in. } { 23 ft. 7 in. × 21 ft. 5 in. × 13 ft. 0 in. }	= 24,156	24,156	
1 Dormitory (1 up), .	64 ft. 0 in. × 26 ft. 8 in. × 13 ft. 2 in.	= 22,471	} 58,117	
2 do. (2 up), . . .	44 ft. 3 in. × 29 ft. 10 in. × 10 ft. 0 in.	= 13,201		
3 do. (3 up), . . .	{ 39 ft. 0 in. × 23 ft. 3 in. × 9 ft. 9 in. } { 27 ft. 2 in. × 6 ft. 9 in. × 9 ft. 9 in. }	= 10,629		
4 do.	39 ft. 6 in. × 29 ft. 8 in. × 10 ft. 1 in.	= 11,816		
Sick Room and Servants' Dormitory, }	30 ft. 0 in. × 14 ft. 10 in. × 10 ft. 1 in.	= 4,487	4,487	
Hospital,	34 ft. 6 in. × 14 ft. 6 in. × 10 ft. 1 in.	= 5,044	5,044	
Work Room,	24 ft. 5 in. × 29 ft. 9 in. × 11 ft. 7 in.	= 8,414	} 43,491	
Covered Playground,	70 ft. 0 in. × 27 ft. 2 in. × 8 ft. 10 in.	= 16,798		
Washing-house, . .	49 ft. 0 in. × 14 ft. 3 in. × 10 ft. 2 in.	= 7,099		
Laundry,	27 ft. 8 in. × 19 ft. 11 in. × 10 ft. 2 in.	= 5,602		
Kitchen,	26 ft. 9 in. × 19 ft. 3 in. × 10 ft. 10 in.	= 5,578		
Total,				135,295

COMMON DINING ROOM.

$$\left\{ \begin{array}{l} 15 \text{ ft. } 8 \text{ in.} \times 17 \text{ ft. } 5 \text{ in.} \times 11 \text{ ft. } 7 \text{ in.} \\ 33 \text{ ft. } 0 \text{ in.} \times 29 \text{ ft. } 11 \text{ in.} \times 11 \text{ ft. } 7 \text{ in.} \end{array} \right\} = 14,597$$

TABLE II.

YEAR.	ST. MARY'S INDUSTRIAL SCHOOLS.				MOSSBANK (BOYS) AND ROTTENROW (GIRLS) INDUSTRIAL SCHOOLS.			
	Aver. No. Inmates.		Died.		Aver. No. Inmates.		Died.	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
1878, . . .	247	204	3	1	414	210	11	3
1879, . . .	241	214	4	4	395	187	10	1
1880, . . .	246	212	5	2	390	199	4	1
1881, . . .	242	208	10	2	384	237*	4	2
1882, . . .	240	202	1	2	368	226	—	—
1883, . . .	231	189	3	3	350	222	1	—
1884, . . .	214	161	3	1	370	215	3	—
1885, . . .	202	158	4	5	395	200	6	1
1886, . . .	203	165	2	1	400	214	2	1
1887, . . .	201	187	1	4	384	205	1	3
Totals, . .	2,267	1,900	36	25	3,850	2,115	42	12

* Transferred to Maryhill, June, 1881.

TABLE III.

DETAILED LIST OF DEATHS IN ST. MARY'S INDUSTRIAL SCHOOLS DURING 10 YEARS, 1878-1887.

BOYS' SCHOOL.			GIRLS' SCHOOL.								
1878.			1879.			1880.			1881.		
G. H.,	9 years,	Pleuro-Pneumonia,	4 days.	M. C.,	15 years,	Phthisis,	3 months.				
P. H.,	10 "	Do.,	4 "								
J. G.,	12 "	Meningitis,	6 "								
J. G.,	13 "	Do.,	10 "								
1879.											
W. L.,	12 years,	Phthisis,	3 months.	S. D.,	13 years,	Bronchitis,					
J. H.,	11 "	Do.,	3 "	C. H.,	10 "	Scarlet Fever,	1 day.				
M. M'G.,	14 "	Meningitis,	1 month.	A. J. K.,	12 "	Meningitis,	6 days.				
P. M'L.,	12 "	Bronchitis and Congestion of Lungs,	2 days.	M. J. S.,	13 "	Scarlet Fever, Pneumonia,					
1880.											
S. H. C.,	13 years,	Cardiac Disease,	Uncertain.	M. M'C.,	12 years,	Phthisis,	3 months.				
C. J. C.,	11 "	Do.,	2 months.	J. B.,	12 "	Do.,	4 "				
F. M.,	13 "	Phthisis,	6 "								
J. D.,	12 "	Do.,	4 "								
J. S.,	13 "	Do.,	4 "								
1881.											
T. O'H.,	10 years,	Congestion of Lungs,	6 days.	E. D.,	7 years,	Acute Bronchitis,	8 days.				
C. D.,	14 "	Phthisis,	6 months.	M. M'C.,	11 "	Congestion of Lungs,	6 "				
P. M'C.,	11 "	Congestion of Lungs,	1 day.								
C. B.,	12 "	Phthisis,	8 months.								
N. C.,	12 "	Pneumonia,	2 "								
P. R.,	8 "	Phthisis,	6 "								
J. M'V.,	14 "	Do.,	3 "								
J. N.,	9 "	Phthisis and Congestion of Lungs,	8 days.								
J. C.,	12 "	Congestion of Lungs,									

TABLE III.—*Continued.*

Boys' SCHOOL.			Girls' SCHOOL.		
1882.			1882.		
M. S., . . .	12 years,	Pneumonia,	B. A. B., . .	6 years,	General Debility and Con- gestion of Lungs, 10 days.
			J. S., . . .	12 "	Enteritis, 1 day.
1883.			1883.		
J. C., . . .	14 years,	Phthisis,	S. M., . . .	13 years,	Phthisis, 3 months.
A. D., . . .	12 "	Do.,	M. O'N., . .	13 "	Do., 3 "
R. C., . . .	8 "	Pneumonia,	M. F., . . .	13 "	Cardiac Disease? Uncertain.
			M. B., . . .	11 "	Phthisis, 6 months.
1884.			1884.		
J. C., . . .	13 years,	Meningitis,			
T. G., . . .	11 "	Croup,			
C. S., . . .	15 "	Phthisis,			
1885.			1885.		
P. C., . . .	15 years,	Phthisis,	C. K., . . .	13 years,	Typhus,
J. M'G., . .	13 "	Do.,	M. A. O'B.,	14 "	Do.,
J. W., . . .	13 "	Congestion of Lungs,	C. S., . . .	12 "	Phthisis, 3 months.
C. M'C., . .	14 "	Phthisis,	A. M'M., . .	14 "	Pneumonia, 8 days.
			M. F. J., . .	11 "	Bronchitis, 1 month.
1886.			1886.		
J. A. G., . .	11 years,	Pneumonia,	J. M'G., . .	12 years,	Meningitis, 10 days.
J. M'N., . .	14 "	Disease of Brain,			
1887.			1887.		
T. O'N., . .	13 years,	Tabes Mesenterica,	J. H., . . .	11 years,	Phthisis, 6 months.
			S. J., . . .	10 "	Meningitis, 8 days.
			M. Q., . . .	14 "	Phthisis, 6 months.
			A. C., . . .	12 "	Acute Phthisis, 3 "

TABLE IV.

DAILY PROGRESS OF DISEASE, WITH METEOROLOGICAL DATA.

DATE.	Cases.	Mean Temperature in Shade.	Rainfall. — Inches.	Hours of Sunshine.	Prevailing Direction of Wind.
Sunday, 26th Feb.,	—	35·4	—	0·3	E
27th „	—	37·0	—	0·2	N E
28th „	—	36·0	—	0·0	N E
29th „	—	36·7	—	0·0	N E
1st Mar.,	—	36·3	—	3·4	E
2nd „	1*	39·2	—	3·4	N W
3rd „	1*	35·7	—	4·8	N
Sunday, 4th „	—	37·0	—	8·1	N
5th „	—	35·4	·02	1·6	W
6th „	—	44·5	·27	1·8	W
7th „	2*	45·0	·59	0·0	S W
8th „	19	49·9	·15	0·8	S W
9th „	15	48·9	·31	0·1	S
10th „	5	46·3	—	5·1	W
Sunday, 11th „	8	38·3	·02	0·0	E
12th „	—	32·5	·03	0 0	E
13th „	4†	32·6	·08	0·8	S E
14th „	—	32·5	·02	0·0	E
15th „	—	32·4	·07	1·4	E
16th „	1	30·5	—	5·7	N E
17th „	2	27·9	—	0·0	N E
Sunday, 18th „	2	31·5	—	5·9	N E
19th „	1	34·6	—	7·9	E
20th „	—	36·3	—	8·9	E
21st „	—	35·5	·11	0·9	E
22nd „	—	42·6	·05	0·0	E
23rd „	1	36·4	·16	5·1	N
24th „	1	36·5	·18	0·0	N E
Sunday, 25th „	1	32·0	·20	0·0	N E
26th „	2	32·0	—	6·9	N E
27th „	1	34·8	—	6·9	N
28th „	—	32·7	·40	0·0	N E
29th „	1	39·3	·19	0·0	N E
30th „	—	42·4	—	0·1	N
31st „	—	41·0	—	9·5	N

* Fatal Cases.

† Two Girls included.

